Plant Syst Evol (2013) 299:1519–1522
DOI 10.1007/s00606-013-0815-9

ORIGINAL ARTICLE

New species of the genus *Epistephium* (Orchidaceae, Vanilloideae)

Dariusz L. Szlachetko · Joanna Mytnik-Ejsmont · Przemyslaw Baranow

Received: 10 October 2012 / Accepted: 7 April 2013 / Published online: 30 April 2013

Abstract The morphological study of the herbarium material representing *Epistephium* (Orchidaceae, Vanilloideae) led to the discovery of two groups of specimens that significantly differ from all known species of the genus. The results of literature data study and of comparative analysis of those and other specimens suggest that these collections represent new taxa that we describe as *E. garayi* and *E. kubiyuense*. The distinguishing features of the species are indicated. As both new species are reported from Colombia (*E. garayi*, also from Guyana), the key for the determination of all Colombian representatives of the genus is included. Information on the ecology and distribution of newly described taxa is presented.

Keywords Colombia · *Epistephium* · Guyana · New species · Orchidaceae

Introduction

Epistephium Kunth is one of the most amazing orchid genera growing in the New World tropics and subtropics. The genus is a small group comprising approximately 30 species. *Epistephium* species are spread from Mesoamerica and northern and central part of South America, from Belize and Trinidad on the north to Paraguay and southern Brazil on the south. Northeastern Brazil is considered the center of its diversification (Pridgeon et al. 2003), but many species were also found in neighboring countries. Our study conducted in various European and Colombian herbaria led us to the conclusion that the other area extremely rich in species is Colombia. We recorded here 13 species, along with two new to science, described below. *Epistephium* species grow in partly grassy areas, savannas or in thickets on lateritic soil, often in fully exposed areas.

Epistephium was proposed by Kunth in 1822. It was named from the Greek *epi*—upon, and *stephanos*—crown, in reference to the crown-like calyculus situated at the capsule apex. What makes the plants belonging to *Epistephium* unusual as for orchids is their habit. Most of the species are reminiscent of heavily branching shrubs rather than herbs. They can reach considerable height, even to 5 m. Leaves are quite variable in form, but most of them possess well-developed net of vascular bundles including numerous anastomoses, hence prominently reticulate-veined. Often, they are thick, coriaceous or leathery and shining when dried. For a change, the flowers of *Epistephium* are typical for orchids. They are large, showy, and often brightly colored resembling those of *Sobralia* Ruiz & Pav., and although the two genera might not be related, they may share similar pollinators (Pridgeon et al. 2003). Both classifications, based on morphological data (e.g. Szlachetko 1995), as well as those on molecular study results (e.g. Pridgeon et al. 2003) place *Epistephium* in the tribe Vanilleae Blume. However, the phylogenetic position of the genus still remains unsatisfactorily resolved.

Collections of *Epistephium* are rather commonly found in herbaria, but it does not mean that they are easily available to study. The flowers are usually heavily pressed, sometimes damaged and very difficult to dissect. Lack of adequate herbarium material and fresh flowers may explain the limited knowledge concerning the genus (Schweinfurth 1958).

The examination of materials collected in Colombia and Guyana has led to the discovery of two new species that we describe and illustrate in the present paper.

D. L. Szlachetko · J. Mytnik-Ejsmont · P. Baranow (✉)
Department of Plant Taxonomy and Nature Conservation, The University of Gdansk, Wita Stwosza 59, 80-308 Gdańsk, Poland
e-mail: przemekbaranow@gmail.com

Materials and methods

The presented data are based on literature analyses and the results of herbarium materials examination. The analysed specimens are deposited at COL and AMES herbaria (herbarium acronyms according to Holmgren and Holmgren 1998). Comparative materials have been examined in BM, K, P and W.

Morphological studies were done using stereomicroscope. The examination of flowers was preceded by their rehydratation.

Results

Both newly described species belong to the informal group of *E. parviflorum*. As they are known from Colombia (*E. garayi* also from Guyana), the key for the determination of all Colombian representatives of the genus is presented as follows:

Key to the Colombian species of *Epistephium*.

1. Plants small, 8–23 cm tall. Leaves shortly petiolate, elliptic to elliptic-obovate, widest near the middle or above …***E. ellipticum***

1. Plants much higher, at least 40 cm tall, usually much more. Leaves sessile or petiolate, oblong-lanceolate to broadly elliptic-ovate, widest in the basal part …2

2. Leaves amplexicaul …3

2. Leaves non-amplexicaul …10

3. Lip orbicular to transversely elliptic, truncate or shortly apiculate at the apex …***E. frederici-augusti***

3. Lip oblong-obovate or so, more or less incised at the apex …4

4. Lamellae or hairs running from the base to the apex of lip lamina …5

4. Cristate lamellae or hairs of various kinds only in the lip center …6

5. Lip in the basal 23 mm connate with the gynostemium; the free part broadly rhombic or broadly ovate, margins more or less undulate, crenulate-serrulate, adorned in the upper part by cuneate, lacerate calli along the mid-vein …***E. lamprophyllum***

5. Lip nearly free from the column, broadly obovate or subrotund, undulate, shortly lacerate and ciliolate at the margin; disc through the longitudinal center with a bearded crest of subulate appendadges extending from the base nearly to the apex and in front of the crest a cluster of numerous folds…***E. amplexicaule***

6. Lip apically deeply incised, hence appearing bilobed …7

6. Lip sinuously notched at the apex …8

7. Lip with oblique lamella just above the base of the lip on either side of the crest, clinandrium 3-lobed …***E. hernandii***

7. Lip without lamellae on sides of the central crest, clinandrium unlobed.…***E. duckei***

8. Floral bracts to 20 mm long, sepals 10–17 mm wide, petals 55–66 mm long and 26 mm wide …***E. brevicristatum***

8. Floral bracts 15 mm long, sepals 10 mm wide, petals to 55 mm long and to 20 mm wide …9

9. Sepals to 45 mm long, petals to 40 mm long, lip wider than long, 25 mm long, 30 mm wide …***E. elatum***

9. Sepals to 57 mm long, petals to 55 mm long, lip longer than wide, 43 mm long, 29 mm wide …***E. macrophyllum***

10. Leaves petiolate, petiole very prominent, at least 1 cm long …11

10. Leaves sessile or sub-sessile, petiole, if present, up to 0.5 cm long …12

11. Petals to twice longer than wide, lip sessile with long hairs in the upper part of the blade and cristate lamellae in the center.…***E. sessiliflorum***

11. Petals ca 4 times longer than wide, lip prominently clawed, fleshy hairs along the mid-vein in the upper part of the lip…***E. parviflorum***

12. Flowers small, to 25 mm long …***E. garayi***

12. Flowers medium-sized, 40–60 mm long …13

13. Lip mid-vein thickened and covered by fleshy hairs from the base to the apex …***E. sclerophyllum***

13. Lip mid-vein thickened in the upper half, with tuft of crested lamellae in the center and long hairs above …***E. kubiyuense***

Epistephium garayi Szlach., Mytnik & Baranow, sp. nov. (Fig. 1).

Appears to be somewhat similar to *E. parviflorum*, from which it differs by having shortly petiolate leaves, lip strongly thickened and covered by soft hairs along mid-vein in the basal half, and by very long hairs above.

Type: Colombia. Vaupes. Cerro de Yapoboda. Savannah, among scrub. At the headwater of Rio Kuduyari. Alt. ca. 200 m. 15 Aug. 1960. *Garay 110* (Holotype: COL!; Isotype: AMES!).

Etymology: Dedicated to Dr. Leslie A. Garay, an eminent American orchidologist.

Terrestrial caespitose plants with simple stems, up to 80 cm tall. Leaves several, petiolate; petiole to 0.5 cm long; blade up to 9 cm long and 3 cm wide, linear-lanceolate to ovate-lanceolate, shortly acuminate, with inrolled margins when dried, stiff, coriaceous, shiny. Recemes up to 20 cm long, elongate, sub-laxly 10–25-flowered. Flowers resupinate, produced in succession, purple, relatively small. Floral bracts 2 mm long, inconspicuous, ovate-lanceolate. Pedicellate ovary 16 mm long. Dorsal sepal up to 20 mm long, 6 mm wide, oblong-oblanceolate, acuminate. Petals up to 20 mm long and 10 mm wide, obliquely

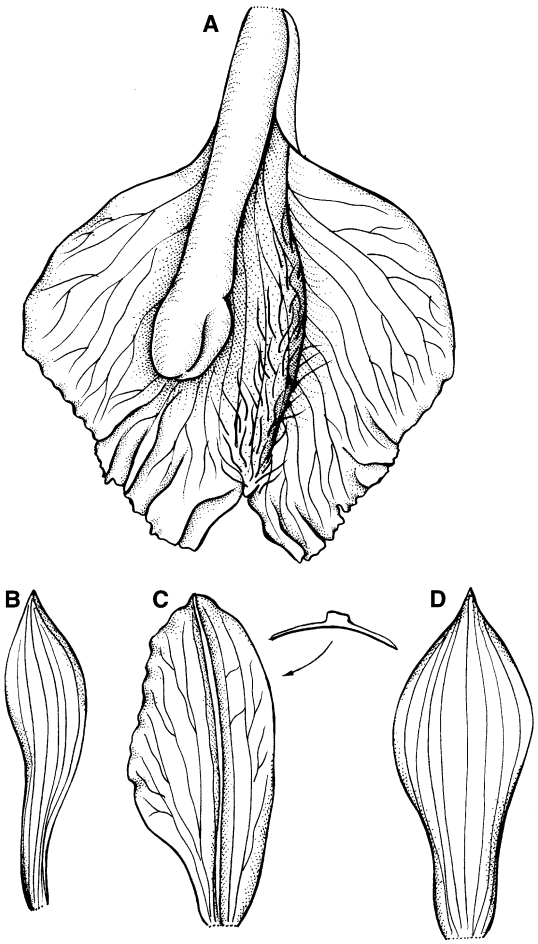

Fig. 1 *Epistephium garayi* Szlach., Mytnik & Baranow: **a** lip, **b** lateral sepal, **c** petal, **d** dorsal sepal (drawn from holotype by Joanna Mytnik-Ejsmont)

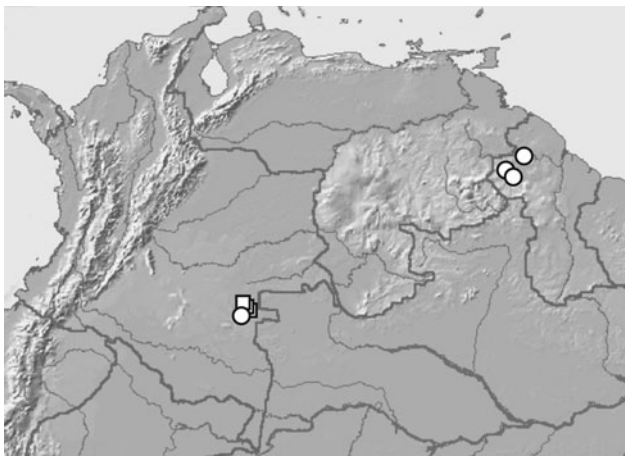

Fig. 2 Distribution of *Epistephium garayi* Szlach., Mytnik & Baranow (*circles*) and *Epistephium kubiyuense* Szlach., Mytnik & Baranow (*squares*)

obovate-elliptic with a sub-obtuse apex and a tapering base, carinate outside. Lateral sepals 21 mm long, 5 mm wide, oblong-oblanceolate, oblique, acuminate, with inrolled margins. Lip clawed, claw 7 mm long, adnate to the gynostemium, free part 15 mm long, 21 mm wide, transversely elliptic-flabellate in outline, rounded at base, deeply bilobed at apex, sub-quadrate, margins strongly undulate-crenulate in the upper part, strongly thickened and covered by soft hairs along mid-vein in the basal half, and by very long hairs above. Gynostemium 20 mm long, relatively massive, straight.

Ecology: Terrestrial.

Distribution: Colombia (Vaupes), Guyana. Alt. 200–1150 m (Fig. 2).

Representative specimens—**Colombia**. Vaupes. Cerro de Yapoboda. Savannah, among scrub. At the headwater of Rio Kuduyari. Alt. ca. 200 m. 15 Aug. 1960. *Garay 110*

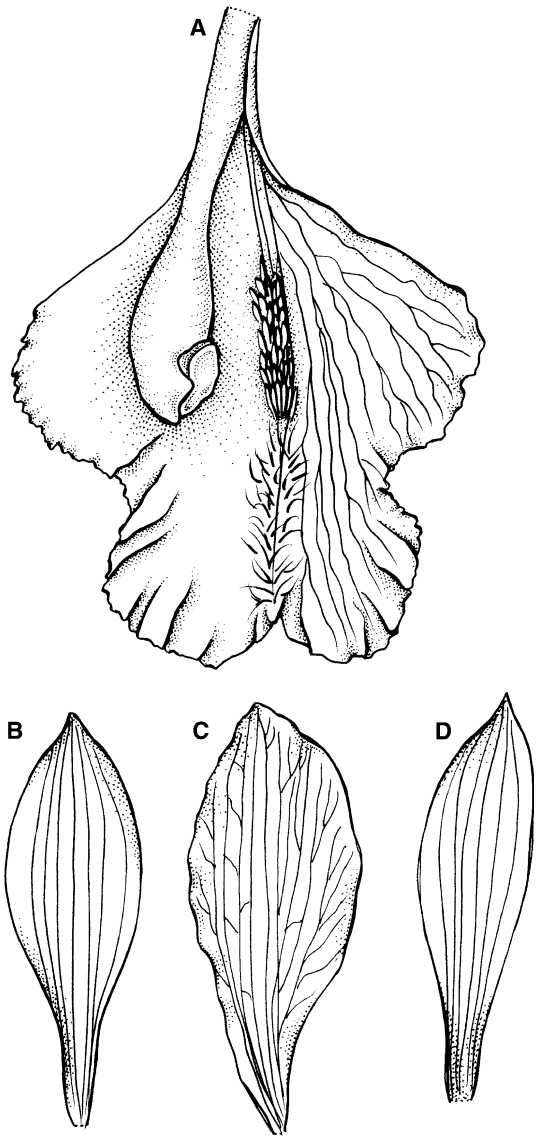

Fig. 3 *Epistephium kubiyuense* Szlach., Mytnik & Baranow: **a** lip, **b** lateral sepal, **c** petal, **d** dorsal sepal (drawn from holotype by Joanna Mytnik-Ejsmont)

(AMES!, COL!). **Guyana**. Pakaraima Mts., Mt. Aymatoi (sandstone). Dry sandstone rocks near falls. Terrestrial herb about 40–60 cm high, tepals and sepals pale purple, lip dark purple, column pale purple. 5°55′N, 61°W. Alt. 1,150 m. 16 Oct 1981. *Maas, Mennega, ter Welle & Groen 5782* (COL!); Pakaraima Mts., Kako Amerindian village, Kako river, white sand savanna. Terrestrial orchid, perianth bright purple. 13 Nov 1979. *Maas & Westra 4403* (COL!); Cuyuni-Mazaruni Region. Gallery forest along Utsche River. 5°45′N, 61°09′W. Alt. 940 m. 23 May 1990. *McDowell 2792 & Gopaul* (COL!).

Epistephium kubiyuense Szlach., Mytnik & Baranow, sp. nov. (Fig. 3).

It differs from other species of the group *E. parviflorum* by having a pandurate lip, emarginated apically with margins irregularly dentate, apical margins undulate, with tuft of crested lamellae in the central cavity, hairy above, with two keels below. Leaves are sub-sessile.

Type: Colombia. Vaupes. Mitu and vicinity. Lower Rio Kubiyu. Sandstone savanna. 30 Jun 1976. *Zarucchi & Balick 1784* (Holotype: COL! 172036)

Etymology: In reference to the name of the river Kubiyu, where type specimen was collected.

Plant known from the apical part only. Leaves sub-sessile, to 11 cm long and 3 cm wide, oblong-lanceolate, shortly apiculate, coriaceous. Inflorescence racemose, 20–25 cm long, sub-densely many-flowered. Flowers resupinate, produced in succession, purplish-pink or lavender, with white column and white underside of lip, medium-sized. Floral bracts 5 mm long. Pedicellate ovary to 32 mm long. Dorsal sepal 46 mm long, 11 mm wide, spathulate to oblanceolate, shortly acuminate. Petals 45 mm long, 17 mm wide, obliquely elliptic or elliptic-ovate above cuneate base, somewhat obtuse, margins slightly undulate, carinate on outside. Lateral sepals 45 mm long, 11 mm wide, oblong-lanceolate to oblong-elliptic, short acuminate, somewhat oblique. Lip clawed; claw 16 mm long; lamina 35 mm long, 32 mm wide, pandurate in outline, apex emarginated, margins irregularly dentate, apical margins undulate, with tuft of crested lamellae in the central cavity, hairy above, with two keels below. Gynostemium 38 mm long, gradually swollen towards the apex.

Ecology: Terrestrial in sandstone savanna.

Distribution: Colombia (Vaupes) Alt. 350–400 m (Fig. 2).

Representative specimens—**Colombia**. Vaupes. Mitu and vicinity. Lower Rio Kubiyu. Sandstone savanna. 30 Jun 1976. *Zarucchi & Balick 1784* (COL!); The same loc., 27 Apr 1975. *Zarucchi 1290* (AMES!, COL!); Rio Kuduyari. Sabana con arenisca de Yapoboda. Alt. 350–400 m. 25 Jun 1958. *Garcia Barriga, Schultes & Blohm 15880* (AMES!, COL!); Rio Kubiyu. Sabana con arenisca de Guranjuda. Alt. 350–400 m. 30 Jun 1958. *Garcia Barriga, Schultes & Blohm 16041* (COL!).

Acknowledgments This article was prepared thanks to a grant from Polish Ministry of Science and Higher Education (NN303 58 1939).

References

Holmgren PK, Holmgren NH (1998) Index Herbariorum: a global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. http://sweetgum.nybg.org/ih/. Accessed 1 June 2007 (continuously updated)

Pridgeon A, Cribb P, Chase MW (2003) Genera Orchidacearum, vol 3. Orchidoideae (Part 2), Vanilloideae. Oxford University Press, Oxford

Schweinfurth C (1958) Orchids of Peru. Fieldiana Bot 30(1):1–260

Szlachetko DL (1995) Systema Orchidalium. Fragm Florist Geobot 3(Suppl):1–152